

1                   **DIRECTION CONTROL DEVICE FOR A CEILING FAN**

2    BACKGROUND OF THE INVENTION

3    1. Field of Invention

4           The present invention relates to a direction control device for a ceiling  
5   fan, and more particularly to a control device that is easy to be installed in the  
6   ceiling fan.

7    2. Related Art

8           The ceiling fan has been widely used to provide a cooling function as  
9   well as a decorative effect. Because the ceiling fan is secured to ceiling and  
10   suspended therefrom, it may have remote control capability so that a user can  
11   conveniently control the operation of the ceiling fan. Such a remote control  
12   operation is accomplished by using a remote controller to transmit wireless  
13   signals to the ceiling fan, and those signals are received by a receiver of the  
14   ceiling fan to control the operation states thereof.

15          FIG. 3 shows a ceiling fan which has a canopy (83), a motor (80), a  
16   hanger rod (82) suspended from the canopy (83) and extending through the motor  
17   (80), a plurality of blades (81) connected to the motor (80) and a switch box (84)  
18   secured to the bottom of the hanger rod (82). The switch box (84) has a pull chain  
19   (85) to be used to manually control the operation of the ceiling fan.

20          Where such a ceiling fan is provided with a remote control and rotation  
21   direction control capabilities, a remote receiver and a direction control device  
22   (not shown) are both installed in the canopy (83). Although the space inside the  
23   canopy (83) is large enough to accommodate the receiver and the direction  
24   device, the installation process is difficult. As the direction control to the motor

1 (80) is accomplished by switching the power connection lines (power polarities)  
2 thereof, the connection lines of the motor (80) have to be connected to the switch  
3 box (84) such that the operation of the motor (80) can be controlled by the pull  
4 chain (85), and then redirected to the switch box (84) through the hanger rod (82).  
5 The hanger rod (82) is hollow to receive electrical wires or the like. However, the  
6 inner diameter of the hanger rod (82) is usually so small such that the connection  
7 wires of the motor (80) are difficult to be extended therethrough. Particularly, the  
8 connection wires have to be manually extended through the hanger rod (82),  
9 which results in difficulty in assembly of a ceiling fan. Therefore, there is a need  
10 for the above ceiling fan control device to be improved.

#### 11 SUMMARY OF THE INVENTION

12 The main objective of the present invention is to provide a direction  
13 control device for a ceiling fan which is easily installed in the ceiling fan.

14 To achieve the objective, the control device includes:

15 a direction control circuit arranged in a switch box of the ceiling fan;

16 a remote receiver arranged in an exterior position away from the ceiling  
17 fan and electrically connected to the direction control circuit;

18 wherein said remote receiver is connected with conducting wires that are  
19 electrically connected to the direction control circuit by a combination of  
20 connectors retained in the switch box of the ceiling fan;

21 wherein said remote receiver is secured on the wall inside the house.

22 Other objectives, advantages and novel features of the invention will  
23 become more apparent from the following detailed description when taken in  
24 conjunction with the accompanying drawings.

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an exploded perspective view of a ceiling fan having a rotation control device installed therein in accordance with the present invention;

Figs. 2A-2C are a circuit diagram of the control device in accordance with the present invention; and

Fig. 3 is a plan view of a conventional ceiling fan.

## DETAILED DESCRIPTION OF THE INVENTION

With reference to Fig. 1, a ceiling fan includes a body (10) having a motor (not shown) contained therein, a canopy (13) mounted above the body (10) via a hanger rod (12), and a switch box (14) secured to the bottom of the body (10).

A direction control circuit (20) is preferably provided inside the switch box (14) and a remote receiver (30), on which manual operation buttons (31) are arranged, can be secured on a wall and electrically connected to the direction control circuit (20) through conducting wires (200) that are indoor wires pre-arranged inside the house. Further, said direction control circuit (20) also could be attached on the body (10) of the ceiling fan.

Further, the direction control circuit (20) is electrically connected with connection lines (not shown) of the motor and conducting wires (200) of the remote receiver (30). The connection lines of the motor and the conducting wires (200) are both connected to a male connector (21). In this preferred embodiment, the direction control circuit (20) is connected to a female connector (22) to correspondingly connect to the male connector (21). With such a connection of male and female connectors (21, 22), the direction control circuit unit (20) is

1 electrically connected to the motor and through the conducting wires (200) to the  
2 remote receiver (30). The detailed operation of the direction control circuit (20)  
3 is explained as follows:

4         With reference to Figs. 2A-2C, the direction control circuit (20) includes  
5 a power supply unit (23) for supply power thereto via the female connector (22),  
6 a detection circuit (24) for sensing signals received by the remote receiver (20), a  
7 microprocessor (25) connected to the detection circuit (24) for receiving the  
8 control signals from the detection circuit (24), and a relay drive circuit (26)  
9 controlled by the microprocessor (25). The female connector (22) has multiple  
10 sockets (numbered from 1 to 9) for receiving the pins (also numbered from 1 to 9)  
11 of the male connector (21), respectively. Therefore, control signals from the  
12 remote receiver (30) can be directed to the female connector (22) via the  
13 conducting wires (200) and transferred to other components.

14         The power supply unit (23) is capable of rectifying and regulating  
15 voltage to provide a working voltage to the entire direction control circuit (20).

16         The detection circuit (24) is used to sense the signals output from the  
17 remote receiver (30), including control signals and an acknowledgement signal  
18 periodically generated in normal condition. All the sensed signals are then sent to  
19 the microprocessor (25) for activating the relay drive circuit (26).

20         The relay drive circuit (26) is provided to control a switch circuit having  
21 two relay switches (260) operated synchronously. The two relay switches (260)  
22 are connected to the two coils of the motor and the input power via an activation  
23 capacitor (27) and the male and female connectors (21, 22).

24         When the relay drive circuit (26) is activated, the two relay switches

1 make changes in switching states at the same time to change the direction of the  
2 current in the coils of the motor thereby making a change in the rotation direction  
3 of the motor.

4 With the structure of the ceiling fan and the control device as described  
5 above, a user can always control the operation of the motor by pressing the  
6 manual operating buttons (31). In addition, when the user makes a change to the  
7 rotation direction of the ceiling fan by using a remote controller, the remote  
8 receiver (30) on the wall receives the control signal and sends it to the direction  
9 control circuit (20) through the conducting wires (200). Accordingly, the  
10 microprocessor (25) of the direction control circuit (20) is operated to activate the  
11 relay drive circuit (26) to synchronously change the states of the two relay  
12 switches of the switch circuit (260) thereby changing the power line connection  
13 of the motor such that the rotation direction of the motor is changed.

14 Because the direction control device in accordance with the present  
15 invention and the remote receiver (30) are respectively installed in the switch box  
16 (14) and on the wall, instead of being installed together, the motor connection is  
17 not required to be redirected to the canopy (13) to provide the ceiling fan with  
18 both the remote control and rotation direction control capabilities. Therefore, the  
19 assembly process for the ceiling fan is easier.

20 The invention may be varied in many ways by a skilled person in the art.  
21 Such variations are not to be regarded as a departure from the spirit and scope of  
22 the invention, and all such modifications are intended to be included within the  
23 scope of the following claims.